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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

AVALANCHE WARNINGS: Content and Dissemination

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Snow avalanche warnings are an effective method of alerting the public to unusually dangerous avalanche conditions. An effective warning message conveys a sense of urgency, and should have an official and authoritative source. The message must be simple, clear, and concise. Warnings are transmitted through the National Weather Service's communications network to the media and public. Timely release of bulletins elicits good media coverage.

Keywords: Warnings systems, avalanches, snow.

Minimizing avalanche-related casualties through effective warning is an important goal of snow safety personnel throughout the Western United States. Rising winter recreation use in the mountain West has increased deaths, injury, and property loss due to avalanches despite better control programs, expanded public education efforts, and the initiation of warning programs. Williams (1975) put the average annual death toll from avalanches at seven, with an annual property loss of \$250,000.

The objective of the avalanche warning program is to warn the public of unusually dangerous avalanche conditions. Warnings are primarily aimed at persons traveling outside controlled areas, where most serious avalanche accidents happen. The program is a cooperative venture between the National Weather Service (NWS) and the U.S. Forest Service (USFS).

Although informal warning programs have been operated on an intermittent basis in Colorado and Washington for a number of years, formal avalanche warnings first became a reality in November 1973.

In fall 1974, NWS and USFS representatives attended a conference on avalanche warnings sponsored by the Alpine Snow and Avalanche Research Project in Fort Collins, Colorado. Several new avalanche warning programs were initiated as a result of this meeting. The purpose of this Note is to examine one topic of the Fort Collins conference: The avalanche warning message and its dissemination.

Content

Every avalanche warning should convey at least four basic points:

- Area covered.
- Duration of warning.
- Reason for the warning.
- Instructions on what people should do to minimize risk.

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The area covered by the warning must be clearly stated so it can be easily identified by anyone with a standard State road map. Details about elevational limits and specific aspects are better left out, because such information is taken literally and snow stability varies widely from place to place. Warning duration needs to be clearly specified: "This warning is valid through Thursday, April 24, 1975." Heavy snow and high winds, wind-deposited snow, or thaw conditions are the most common reasons given for issuing a warning. Finally, a statement notifying back-country travelers to avoid known avalanche paths, steep slopes, and gullies is needed. The words **back-country travelers** can optionally be changed to **mountain travelers** to indicate a higher degree of hazard.

The message should be simple, clear, and concise; it should avoid use of technical terms and jargon. To be effective, warnings must convey a sense of urgency,² and have an official and authoritative source easily identified by the public. Finally, a standard format is needed to insure uniformity and completeness of successive messages. Sample formats of a warning and its termination are given in figures 1 and 2.

Dissemination

Dissemination of warning messages plays a key role in the warning process. The most accurate and carefully worded warning will fail unless it receives wide and timely distribution. The NWS's communications network is an efficient and effective method of getting the warning to the media and public. Avalanche warnings transmitted through NWS facilities reach wire services, radio, television, and major newspapers simultaneously. Further coverage in population centers near the mountains is available through NWS VHF-FM radio broadcasts. These messages are transmitted 24 hours a day on frequencies between 162.40 MHz and 162.55 MHz. Special receivers are available at commercial outlets in a variety of types at reasonable cost. A third method, the Codaphone, also is used to convey messages to the public (see Special Avalanche Statement for January 16, 1975, p. 7).³

²Personal communication with Bill Proenza, NWS Central Region Headquarters, Kansas City, Missouri.

³The U.S. Forest Service codaphone number in Denver, Colorado, is 303-234-4745.

The media are a key link in the warning system. Lack of response at this level ends the warning process. First of all, avalanche warnings are new. Second, the mass media are based in large cities far removed from the avalanche problem, so their awareness level is low. Finally, avalanche warnings must compete with local and national news and severe weather warnings. Some of these, particularly heavy snow and high wind warnings, frequently coincide with avalanche warnings. Add related storm news to this, and there is more weather news than time allows for the weather programs, where most avalanche warnings are aired.

The media-awareness problem can be alleviated by personal contact with key news persons. Such contacts raise interest levels and improve reception of avalanche warnings. Some news personnel will want to do a feature story on avalanches; this presents further opportunity for exposure, and can provide first-hand knowledge through a field trip to an active avalanche area. The result often gives needed exposure to the public and media alike.

Timing the release of warnings for maximum exposure is important, even with a well-informed media. Warnings released when media staffing levels are low seldom reach the public. Best times for release are: 0530-0600; 1100; 1530-1600; and 2000 local standard time. The earliest release time gives coverage on morning radio and television. The late morning spot hits noon news, while the afternoon and evening times are set for evening news. The largest audience is reached by early morning radio.⁴ The second biggest audience is reached by 10 p.m. television. Warnings released between 1530 and 1600 get double coverage on early evening and 10 p.m. news. Unfortunately, rapid development of dangerous avalanche conditions seldom coincides with good release times. This situation is handled best by releasing the first warning when needed, and re-running it at the next best time for good news coverage.

When warnings are in effect, media coverage is improved by sending more than one warning per day. Best results have been achieved with a morning and late afternoon bulletin each day. These bulletins catch key media personnel on both morning and evening shifts. Successive bulletins, supplying updated information on the number of avalanches reported since issuance of the first warning, appear

⁴Personal communication with Charles Umpenhour, KOA Radio and Television, Denver, Colorado.

AVALANCHE WARNING

ZCZC

AVUS _____
(Code) (Date-time group)

... AVALANCHE WARNING ... BULLETIN NUMBER _____
IMMEDIATE BROADCAST REQUESTED

U.S. FOREST SERVICE _____
(Town) (State)

ISSUED _____ AM _____
(Time) PM (Zone) (Day, Month, Date, Year)

(Area covered - general)

AN AVALANCHE WARNING IS IN EFFECT FOR

(Names of mountain ranges, passes, known landmarks or towns: be specific)

(Name of State is mandatory)

THIS WARNING IS VALID UNTIL _____ AM
(Time) PM

(Day, month, date, year)

(Cause for warning)

(Precautionary measures)

(Miscellaneous information)

THE NEXT SCHEDULED UPDATE ON THIS SITUATION WILL BE AT

_____ AM _____
(Time) PM (Day, month, date, year)

OR

THE NEXT AVALANCHE WARNING BULLETIN WILL BE ISSUED _____ AT _____ AM
OR EARLIER IF CONDITIONS WARRANT. (Day) (Time) PM

(Name of person(s) issuing bulletin, organization, town, State)

Figure 1.—Sample format, avalanche warning.

AVALANCHE WARNING TERMINATION

ZCZC

AVUS _____
(Code) (Date-time group)

... AVALANCHE WARNING TERMINATION ... BULLETIN NUMBER _____
IMMEDIATE BROADCAST REQUESTED

U.S. FOREST SERVICE _____
(Town) (State)

ISSUED _____ AM _____
(Time) PM (Zone) (Day, month, date, year)

(Area affected - general)

THE AVALANCHE WARNING FOR THE _____
(Area under warning)

MOUNTAINS HAS BEEN TERMINATED.

POCKETS OF UNSTABLE SNOW REMAIN. _____
(Type of traveler)

SHOULD OBSERVE NORMAL PRECAUTIONARY MEASURES.

THIS IS THE LAST BULLETIN ON THIS AVALANCHE SITUATION.

(Name of person(s) issuing bulletin, organization, town, State)

Figure 2.—Sample format, avalanche warning termination.

to heighten public awareness. Variation in message style improves media acceptance. Important changes in warning area coverage and current mountain weather conditions should be included when appropriate. Bulletins are numbered consecutively for each warning period. The initial bulletin in each series is always number one.

Termination bulletins should be issued when avalanche danger returns to normal. Random avalanches may be triggered in certain areas on most winter days. This is a normal winter condition, and a statement in the final bulletin reminding persons of this possibility is appropriate. An example of a series of avalanche warnings follows.

ZCZC
AVUS RWRC 131700

....AVALANCHE WARNING....BULLETIN NUMBER 1
IMMEDIATE BROADCAST REQUESTED
U.S. FOREST SERVICE FORT COLLINS COLORADO
ISSUED 11 AM MDT SUNDAY APRIL 13 1975

SOUTHWESTERN COLORADO MOUNTAINS

AN AVALANCHE WARNING IS IN EFFECT FOR THE SAN JUAN MOUNTAINS OF COLORADO THROUGH MONDAY APRIL 14 1975. HEAVY SNOWFALL HAS CREATED DANGEROUS AVALANCHE CONDITIONS. NUMEROUS AVALANCHES WERE REPORTED THIS MORNING....MORE SNOWSLIDES ARE EXPECTED.

MOUNTAIN TRAVELERS SHOULD AVOID KNOWN AVALANCHE PATHS....STEEP SLOPES....AND GULLIES. BETWEEN 20 AND 40 INCHES OF SNOW FELL IN THE WARNING AREA THIS WEEKEND.

ANOTHER AVALANCHE BULLETIN WILL BE ISSUED LATER TODAY.

JUDSON....USFS. FORT COLLINS COLORADO

ZCZC
AVUS RWRC 140230

....AVALANCHE WARNING....BULLETIN NUMBER 2
IMMEDIATE BROADCAST REQUESTED
U.S. FOREST SERVICE FORT COLLINS COLORADO
ISSUED 830 PM MDT SUNDAY APRIL 13 1975

SOUTHWESTERN COLORADO MOUNTAINS

THE AVALANCHE WARNING FOR THE SAN JUAN MOUNTAINS OF COLORADO REMAINS IN EFFECT THROUGH MONDAY APRIL 14 1975. HEAVY SNOW WHICH FELL IN THE WARNING AREA THIS WEEKEND IS STABILIZING AND DANGER FROM SNOWSLIDES IS MODERATING. THIRTY-SIX AVALANCHES WERE REPORTED SUNDAY AND A FEW MORE ARE EXPECTED.

BACK-COUNTRY TRAVELERS SHOULD AVOID KNOWN AVALANCHE PATHS.... STEEP SLOPES....AND GULLIES. BETWEEN 20 and 40 INCHES OF NEW SNOW FELL IN THE SAN JUANS OVER THE WEEKEND.

THE NEXT AVALANCHE WARNING BULLETIN WILL BE ISSUED MONDAY AT 4 PM OR EARLIER IF CONDITIONS WARRANT.

JUDSON....USFS. FORT COLLINS COLORADO

ZCZC
AVUS RWRC 142210

....AVALANCHE WARNING TERMINATION....BULLETIN NUMBER 3
IMMEDIATE BROADCAST REQUESTED
U.S. FOREST SERVICE FORT COLLINS COLORADO
ISSUED 4PM MDT MONDAY April 14 1975

SOUTHWESTERN COLORADO MOUNTAINS

THE AVALANCHE WARNING FOR THE SAN JUAN MOUNTAINS HAS BEEN TERMINATED. SNOW COVER IN THE WARNING AREA CONTINUES TO STABILIZE. SCATTERED AVALANCHE ACTIVITY OCCURRING TODAY SHOULD CEASE TONIGHT WHEN TEMPERATURES DIP BELOW FREEZING. RANDOM POCKETS OF UNSTABLE SNOW REMAIN.

BACK-COUNTRY TRAVELERS SHOULD USE NORMAL PRECAUTIONARY MEASURES.

THIS IS THE LAST BULLETIN ON THIS AVALANCHE SITUATION.

JUDSON....USFS. FORT COLLINS COLORADO

Special Situations

Situations may develop when avalanche danger fails to meet the criteria for a warning,⁵ but

⁵Warnings in Colorado were issued during the latter part of the 1974-75 season when 10 percent or more of the avalanche paths in a region were expected to run naturally to midtrack or beyond, and/or one-third or more of the paths subject to control were expected to run to the midtrack level or beyond.

avalanche conditions need to be publicized. Routine weekend bulletins may serve this need. Special avalanche statements are used in Colorado. The statements have the advantage of covering any situation when needed. Two statements issued during winter 1974-75 are given as examples:

Discussion and Summary

More than 100 avalanche warning bulletins were issued in Colorado during the winters of 1973-74 and 1974-75. Numerous additional bulletins were issued in other western States. Although avalanches claimed 34 lives and caught over 300 persons in the United States during this period, we feel the warnings provide a worthwhile service which should be continued. Content, format, and timely dissemination of avalanche warnings play an important role in public response—the crux of the warning problem.

Personal response to warnings is a complicated process beyond the scope of this Note. Persons

issuing avalanche warnings will benefit from McLuckie's (1974) detailed report and Riley's (1971) study on this subject.

In summary, the program objective is to warn the public of unusually dangerous avalanche conditions. The warning message should be simple, clear, and concise. Bulletins should follow a standard format and must have an authoritative source. Good public credibility is maintained by supplying the latest avalanche information in each warning message. The area covered, duration of the warning period, reason for issuance, and instructions for safe conduct in the warning area should be included in every bulletin. Timely release of warning bulletins gives good media coverage. More than one bulletin per day insures

ZCZC

AVUS RWRC 162005

....SPECIAL AVALANCHE STATEMENT....

IMMEDIATE BROADCAST REQUESTED

U.S. FOREST SERVICE FORT COLLINS, COLORADO

ISSUED 105 PM MST THURSDAY JANUARY 16, 1975

COLORADO ROCKIES

AN UNUSUAL AVALANCHE SITUATION EXISTS IN THE COLORADO MOUNTAINS. THE STRUCTURAL WEAKNESSES WHICH DEVELOPED IN THE SNOWPACK LAST NOVEMBER ARE EXPECTED TO PERSIST FOR SEVERAL WEEKS. CONTINUING INSTABILITY OF THIS MAGNITUDE IS VERY RARE.

ALTHOUGH THE NUMBER OF AVALANCHES OCCURRING IS LOW, THE UNSTABLE SNOWPACK CAN BE READILY TRIGGERED BY BACK-COUNTRY TRAVELERS OR EVEN A FEW INCHES OF NEW SNOW.

BACK-COUNTRY TRAVELERS ARE URGENTLY ADVISED TO AVOID SLOPES, GULLIES, AND NARROW VALLEYS.

THE 8 SKIERS KILLED IN COLORADO AVALANCHES THIS WINTER TIES THE MODERN DAY RECORD OF 8 DEATHS IN THE WINTER OF 1961-62.

CALL 234-4745 FOR CURRENT INFORMATION ON THIS AVALANCHE SITUATION.

JUDSON/WILLIAMS. . . USFS. FORT COLLINS, COLORADO

better media response and heightens public awareness.

Acknowledgment

Direct assistance from National Weather Service personnel helped the avalanche warning program off to a good start. Personnel from the Weather Service Forecast Office (WSFO) in Denver put avalanche warnings out quickly. They also helped with wording and format. WSFO forecaster Henry W. Chidley was especially helpful in all phases of the warning program. Bill Proenza, of the NWS Central Region Headquarters, gave valuable assistance in developing message content and format. The format in figure 1 was patterned after NWS Severe Weather Bulletins.

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ZCZC

AVUS RWRC 251130

....SPECIAL AVALANCHE STATEMENT....

IMMEDIATE BROADCAST REQUESTED

U.S. FOREST SERVICE FORT COLLINS, COLORADO

ISSUED 530 AM MDT FRIDAY APRIL 25, 1975

.....AVALANCHE DANGER FROM SPRING SNOWSLIDES IN COLORADO.....

RECENT WARM WEATHER HAS BROUGHT SNOW TEMPERATURES TO THE MELTING POINT IN SOME AVALANCHE ZONES. THE MOUNTAIN SNOW COVER IS BEGINNING TO WEAKEN AND SEVERAL SNOWSLIDES HAVE ALREADY OCCURRED. DANGER FROM THESE SPRING AVALANCHES WILL CONTINUE INTO JUNE... BUT THE MOST SERIOUS AVALANCHING SHOULD OCCUR DURING THE NEXT 3 WEEKS. INTENSITY AND MAGNITUDE OF AVALANCHING WILL DEPEND ON WEATHER DURING THIS TIME.

LARGE AND POTENTIALLY DESTRUCTIVE AVALANCHES MAY OCCUR IN THE COLORADO ROCKIES THIS SPRING DUE TO STRUCTURAL WEAKNESS WHICH FORMED IN THE SNOW LAST NOVEMBER.

BACK-COUNTRY TRAVEL WILL BE SAFEST DURING THE EARLY MORNING HOURS BEFORE 11 AM. TRAVEL IN AVALANCHE TERRAIN BETWEEN 11AM AND SUNDOWN WILL BE VERY DANGEROUS WHEN AIR TEMPERATURES ARE ABOVE FREEZING. BACK-COUNTRY TRAVELERS SHOULD AVOID KNOWN AVALANCHE SLOPES AND GULLIES.

ADDITIONAL STATEMENTS AND/OR AVALANCHE WARNINGS WILL BE ISSUED AS CONDITIONS WARRANT.

JUDSON....USFS. FORT COLLINS COLORADO